BIOSCIENCES BIOTECHNOLOGY RESEARCH ASIA, June 2022. Vol. **19**(2), p. 451-457

Indigenous Knowledge of Tribal Traditional Medicinal Plants: An Experimental Research

Ranajit Sardar* and Nabanita Giri

Acharya Prafulla Chandra College, New Barrackpore, West Bengal, India.

http://dx.doi.org/10.13005/bbra/2999

(Received: 04 February 2022; accepted: 23 June 2022)

Many tribal communities are still using today traditional medicinal plants across the India. Our research paying attention on current use of such plants in different tribal communities' in the Sundarban mangrove forest region. Twelve villages of four blocks (Gosaba, Basanti, Kultali, PatharPratima) and adjoining forest area are being selected for data collection regarding traditional medicinal plants during 2016-2019 covered roughly entire the seasons of the year. Information was obtained through respondents. A total 12 key informants has been chosen for interview and everyone is local tribal people and also herbalists. Cuts & wounds, digestive disorders, diarrhea, dysentery, appetite & Blood pressure diseases etc. may be treated through the different medicinal plants. One particular variety was used for cuts & wounds; another for dysentery, 1 variety for Blood pressure diseases; 1 variety for stomach trouble; 1 variety for lower abdomen pain; 1 species for cough, and as tonic; and the rest of plants (3 species) are used for preparation of vitamins respectively. Conclusion: Sundarban is the mangrove forest biodiversity region. Various medicinal plants are being used by the local tribal people depending on their traditional knowledge. Although use of modern medicine is so fast with safety and faith, however, medicinal plants have potential values which are not properly explored. If these plants effectively used for various human disorder with scientific way, then scientific acceptance will increase. That is why the result of this study is justified for the benefit the entire society.

Keywords: Ayurvedic; Conservation; Medicinal plants; Traditional herbalists; Vaidays.

We call our country the Botanical garden of the world because there is a huge wealth of herbal medicines. India has a rich diversity of animal and plants due to its wide range of topographic and climatic diversity (Bhattacharya, 1997)[1]. People used medicinal plants from ancient times. "From around1500 B.C. Rig Veda is one of the important earliest available documents which emphasize herbal medicinal knowledge". (Choudhury, et.al. 2012; Dutta & Dutta, 2005; Farnsworth, 1988; Ignacimuthu, Ayyanar & Sankarasivaraman, 2006 &2008) [2-6]. Indian Herbalists like Maharshi Charaka and Sushruta continued their research on different medicinal plants to cure many ailments of human body (Jain, et.al. 2010; Jeyaprakash, et.al. 2011; Jain, 1981; Jagtap, Deokule & Bhosle, 2006; Kala, 2005; Mahishi, Srinivasa & Shivanna, 2005; Prain, 1963; Rajendran, Chandrasekar & Sundaresan, 2002; Singh, &Lahiri, 2010)[7-15]. Thereafter, it is stated that "traditional healers use

*Corresponding author E-mail: ranajitsardar1404@gmail.com

near about 2500 plant species and 100 species of plants serve as regular sources of medicine" (Pei, 2001).[16]

The World Health Organization (WHO, 2005)[17] has declared that 80% of the world's population depends on conventional medicine for its prime health care and has become essential for its continued existence. In view of the fact that times immemorial, plants have been put to remedial use by the habitual medicine man (meaning of each), *Hakims, Vaidays, Ayurvedic* specialist and the common man. For the period of the past one century, there has been a speedy expansion of allopathic medicinal treatment in India but still now the use of natural products as medicine; particularly products from plants are extensively used among different tribal people; predominantly in the isolated areas of West Bengal with few health conveniences. The information connecting to the medicinally functional species and their uses along with conventional understanding and practices are very fragmentary. Actually this study is thus an effort to essay of various plant species of South 24 Parganas district used by the local medicine man to make well diverse ailments.

MATERIALS AND METHODS

Intensive field work has been carried out among tribal people of 12 villages of four blocks (Gosaba, Basanti, Kultali, PatharPratima) and adjoining forest area during 2016-2019 covering throughout whole year. Standard approaches and methodologies are used for collection of information on ethno-medico-botanical aspects. Key Informants of the study are village chiefs (*Burahs*), medicine men, *Ojha*, local old women, who have the practical knowledge and experience of utilizing medicinal plants to cure ailments of human body. Munda, Bediya, Oraon provided information about the use of plants, preparation of herbal medicine and information of particular plants and particular diseases. To identify authentically various fauna and flora help has been taken from department of Botany and Microbiology of Acharya Prafulla Chandra College, New Barrackpore, Kolkata 700131, West Bengal, India.The Vivekananda Institute of Biotechnology departments (Nimpith, Ramkrishna Mission.)[18-19] also have supported the identification of different kinds of chemicals of different parts of plants. A chart was made for the use of medicinal plants according to their use for different disease maintaining correct nomenclature followed by the vernacular names and their ethno medicinal uses by these three above mentioned communities.

Keora fruits (Sonneratiaapetala) and Dhundul Fruits (Xylocurpusgranatum) are two important species, associated with mangrove forest, and are reasonably used by this tribal populace. They mainly use the fruits juice and dust to control problems of dysentery and indigestion. Bacterial infection along with other factors of the abdomen leads to indigestion. We have tried to explore the justification of the use of this species for the beneficial effect of ailing tribal populace. Our sole objective is to establish the scientific validity of traditional use of this species by indigenous people in Indian Sundarban. Some established authentic methods have been taken into consideration to clarify indigenous knowledge regarding its uses.

Sample collection

We have collected different parts of Keora fruits from the fishermen and wood cutters who go to Sundarban for fishing and collecting wood for their sustenance. During fishing and collecting wood, they also collect different parts of these two plants as it becomes more useful medicinal plants for their community. We have collected fruits of this species from them as these are authentic and genuine medicinal sources during our field investigations. Then we preserved those following standard methods and techniques.

Sample preparation

First of all, fruits of Keora (Sonneratiaapetala) are taken. Then the fruits are cleaned with fresh water. Next these are rubbed and rinsed with distilled water. After that these are boiled in the fresh container for 30 minutes. Then boiled sample was mixed with purified water in a container and then sieve the mixture in a clean kitchen to get a fine liquid. Next the liquid is stored in a sealed container. Thus, it is preserved it is preserved for future use.

Preparation of stock solution

A mixture of 200mg/mL is prepared by dissolving 5grams Keora liquid into 10mL water or ethanol.

Test for extract

A lower layer of mixture is formed with

Table 1. Herbal Medicinal Plants and their uses.

Sl.No	Local name	Scientific name & Family	Parts used	Diseases/Ailments cured
1	Kankra	Bruguieragymnorhisa&Rhisophoruceae	Flower	Increase the temperature of body
2	Dhundul	Xylocarpusgranatum&Meliaceae	Fruit	To Control Digestion Problem and loose motion.
3	Hental	Phoenix paludosa&Arecaceae	Upper soft part	To Control Cough
4	Sundari	Heritierafomes&Malvaceae	Fruit	For stool Clearness
5	Garjan	Rhizophoraapiculata&Rhizophoruceae	Flower	For preparation of vitamin
6	Keora	Sonneratiaapetala&Lythraceae	Fruit	Dysentery
7	Gewa	Excoecariaagallocha& Euphorbiaceae	Honney of flower, leaf	Increase the temperature of body, cut wounded.
8	Passur	Xylocarpusmekongensis&Meliaceae	Bark	Abdominal worm
9	Baen	Avicennia marina &Avicenneaceae	Honney of flower	To increase immunity power
10	Khalsi	Aegicerascorniculatum& Primrose/ Myrsine	Honney of flower	Heart problem
11	Arjuna	TerminaliaArjuna/combretaceae	Bark	Congestive heart failure, hypertension

Table 2. Name & Address of traditional medicine men and informants:

Sl.No	Name	Address	Disease/Ailment treated
1	Harichandsardar	Village- TipligheriPara,P.O-Sadhupur, PS- Gosaba Coastal Thana, South 24 Parganas,W.B	Primary Health Problem, Digestion problem
2	Arjun Sardar	Village – Bangheri, P.O- Kantamari,P.S- Kultali, South 24 Parganas, W.B	Informant
3	NagenSardar	Village- Anpur,P.O-Jamespur, P.S- Gosaba, South 24 Parganas,W.B	Primary Health Problem,
4	NantaSardar	Village – Bangheri, P.O- Kantamari,P.S- Kultali, South 24 Parganas, W.B	Primary Health Problem,Poor Location
5	FulbasiSardar	Village- Anpur,P.O-Jamespur, P.S- Gosaba, South 24 Parganas, W.B	Informant
6	NandaraniSardar	Village – Kantamari, P.O- Kantamari,P.S- Kultali, South 24 Parganas, W.B	Informant

components like 1mL solvent, equal volume of chloroform and 3 drops of concentrated sulphuric acid.

Antibacterial activity analysis

Escherichia coli AG100, *Shigellaflexneri* 2a, *Shigelladysenteriae* 1 were used in this study. These bacterial culturewere obtained fromDepartment of Microbiologyat Acharya Prafulla Chandra College, New Barrackpore, Kolkata -700131,West Bengal, India. For the antibacterial activity analysis, bacterial culture with OD_{700} = 0.6 was spread on nutrient agar plate (Peptone= 6 gm, Beef extract = 3 gm, Nacl= 1.5 gm, Agar= 18 gm in 1000 ml, pH= 7.5). 10 µl spot from the extract was given on that plate. All the plates were incubated in BOD at 37° C for 24 hrs. The Result was observed thereafter.

Standardization and Experiment

These solvents were isolated and sub-cultured another fresh plate. There was no

Fig. 1. Broad Study Area

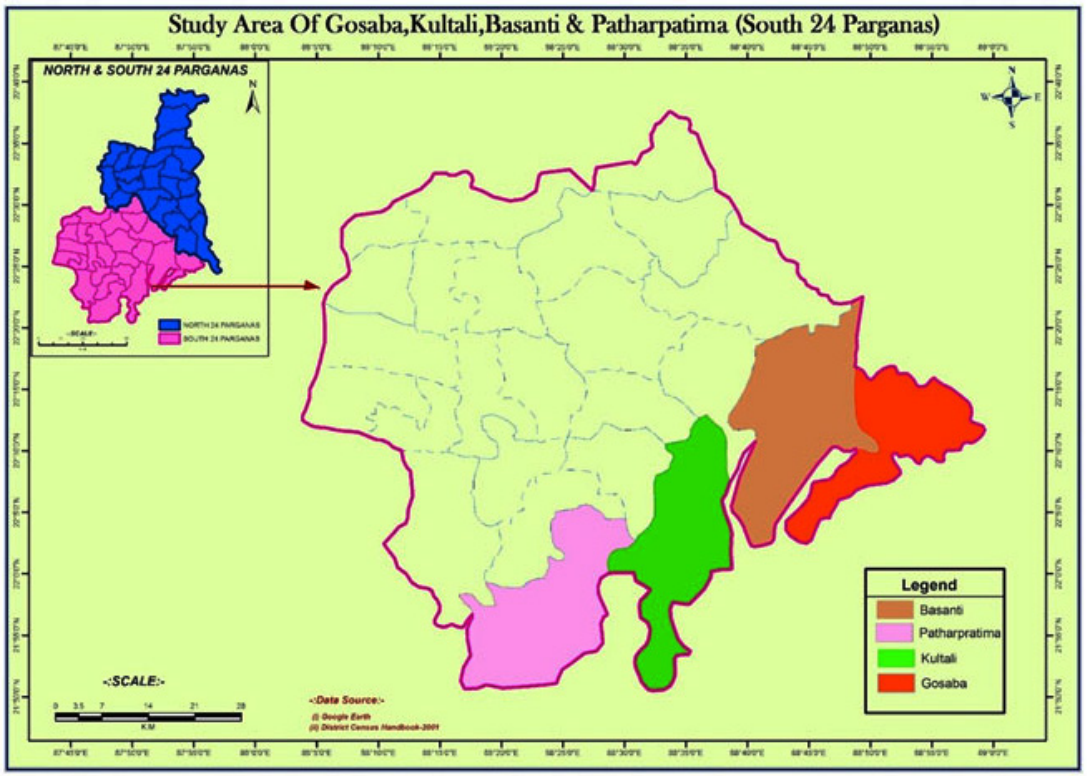
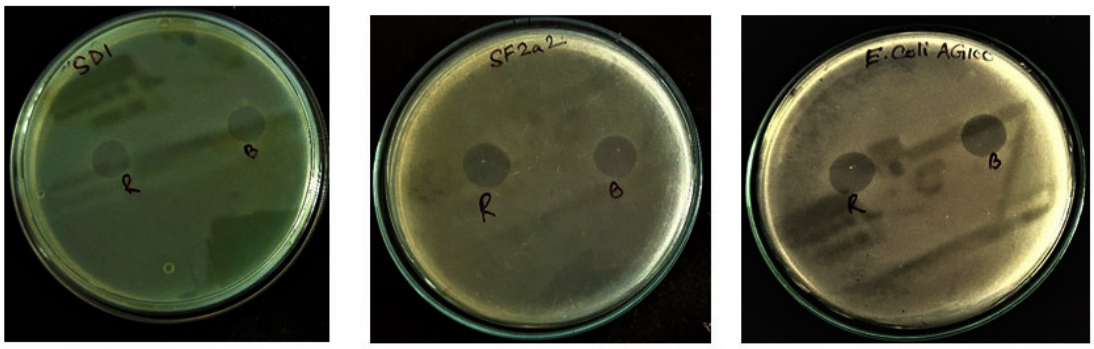


Fig. 2. Proper Study Area (Gosaba,Kultali, Basanti and Pathapratima,S-24 Parganas)



3a **3b** **3c**

R referred to raw extract from Keora fruits

B referred to boiled extract from Keora fruits.

Fig. 3. Antibacterial activity of fruit extract was analyzed by spot test assay

bacterial growth seen during 24-72 hours in room temperature (37° C). These method described by "national committee for Clinical Laboratory Standard was used." (National Committee for Clinical Laboratory Standard Wayne, 2000). [21]

Broad study area

"The largest silt made deltaic region & mangrove forest area of the world lies in the active delta region of Bengal from where begins the Bay of Bengal, India. The Sundarban region is located between $21^0$32' N and $22^0$40'N latitude & between $88^0$05'E & $89^0$00'E longitude. This region is stretched from the east bank of the river Hooghly to the west bank of the river Meghna in Bangladesh. The total area it covers is 8, 00,000 hectares. Only 1/3rdpart (40%) of this region is situated in West Bengal, India" (Sardar, et. al. 2016). My study area is basically four blocks of South 24 Parganas namely Gosaba, Basanti, kultali and Patharpratima.

RESULT AND DISCUSSION

A number of villages vizTipligheriPara, NetajiSardarPara, Anpur, ChotoMollakhali, Bangheri etc were contacted. Different tribes residing in the study area helped to gathered sufficient information on medicinal plants. The uses of these plants were carried from generation to generation orally. Harichand Sardar, Nagen Sardar (Table-2) has made a useful study relating to treatment of disease by using herbal plants. They believe that the plants of Sundarban can save our life by means of protection as well as indigenous medicine. It was observed that the tribes used medicinal plants which are all mangrove forest vegetation. There are 11 species identified and their utility is also different. The study exposed that diverse tribes of study area use different plants for cuts & wounds, digestive disorders, diarrhea, dysentery, appetite & Blood pressure diseases etc. 1 species are used for cuts & wounds; 1 species for dysentery; 1 species for Blood pressure diseases; 1 species for stomach trouble; 1 species for lower abdomen pain; 1 species for cough, and as tonic; and the rest of plants (3 species) are used for preparation of vitamins. Experiment has been made on extracts of Keora Fruits to prevent the digestion problem.

It usually happens for the cause of E-Coli (Escherichia Coli) which was discovered by German bacteriologist Theodore Von Escherich in 1885. Tribal people believe that the chanting *mantras* and incantation during use of plants increases the curing power of herbal plants. These traditional practices enhance the faith and positivity in both the persons who treats (Kabiraj) and who is treated. The scientific name, family and their utility are reported accordingly (Table-1).

CONCLUSION

While the records of our ethno botanical survey provide 11 herbal plant materials used as traditional medicines, our focus on keora fruits

for scientific experiment. Some informants gave special importance for use of some specific medicinal plants. Particularly, this is very effective but not easy to access. By interviewing the key informants, we are able to focus on Keora fruits as herbal medicine to prevent of Dysentery and indigestion.

Those medicinal plants that are commonly used were made by fishermen and also herbalists. They use this type of traditional medicine during fishing. It seems that younger generations give less importance on using traditional medicine. So, if the central government takes responsibility to provide knowledge about traditional medicine, then it would benefit our society.

While the culture of tribal society in Sundarban region has changed during last 100year, community depends almost equally on traditional herbal plants like before. People need not go back to archaic mode of life to use traditional plants but new modern method should be applied for proper utilization of traditional plants that are used to recover the human body from various ailments. This process must be governed by community itself.

As the corresponding author is a tribal person in the birthplace of Sundarban, knowledge has been gathered about traditional medicinal plants from his predecessor. While applying this process the researcher has to face some limitations that can be overcome with the help of modern science and technology. This kind of indigenous research basically concerned with Anthropo-Geographic point of view but it has been proved with help of micro-biological scientific knowledge. So, this research has been carried out both Anthropo-Geographic and Microbiology discipline.

Bacterial culture was grown on hard agar plate (1.8%). On the plate, 10 µl spot was given from the crude extract sample. Clear lysis zone on the bacterial culture indicates the growth inhibition property of the extract solution. 3a. Clear spots on Shigelladysenteriae 1 plate 3b. Clear lysis spots on Shigellaflexneri 2a 3c. Clear spots on *E.coli* AG100.

ACKNOWLEDGEMENT

The authors would like to acknowledge Dr.NabanitaGiri, Assistant Professor of Department of Microbiology of Acharya Prafulla Chandra College, New Barrackpore, West Bengal, India to use the laboratory and provide bacteria (Escherichia Coli) for scientific experiment. Gratitude is also given to Vivekananda Institute of Biotechnology, Nimpith, South 24 Parganas, West Bengal, India for preparation of solvent of Keora Fruits (Sonneratiaapetala & Lythraceae). We would also like to thank our informants and Fisherman and woodcutter for their unselfish help and support. I am of course grateful to Prof. Sukla Basu for their continuous support and inspiration for research work.

Authors' contribution

RS carried out the field study, analyzed data and drafted the manuscript. NG revised the manuscript, contributed ideas to discussion and finally approved the final manuscript.

Funding

This work was financially supported by University Grant Commission, New Delhi, India.

Ethics approval and consent to participate

We followed the ethical guidelines adopted by the international society of Ethno biology (2008). All participants of key informants were asked for their free prior informed consent before interviews were conducted.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

REFERENCES

1. Bhattacharyya, UC. Flora of West Bengal, Vol. I. Kolkata: Botanical Survey of India 1997.
2. Choudhury, et.al. Chorei tribes of Southern Assam, North Eastern India. *Asian Pac J Trop Dis*.;2012; **2**(Suppl 1):S141–S147
3. Dutta, BK. & Dutta, PK. Potential of ethnobotanical studies in North East India: an overview. *Indian J TraditKnowl.;*2005; 4: pp 7–14.
4. Farnsworth, NR. Screening plants for new medicines. In: Wilson EO, editor. Biodiversity. Washington DC: National Academy Press; 1988; pp. 83–97.
5. Ignacimuthu,S. Ayyanar,M. Sankarasivaraman, K. Ethnobotanical investigations among tribes in Madurai district of Tamil Nadu, India. *J Ethnobiol Ethnomed.,* 2006; **2**: 25.

6. Ignacimuthu, S. Ayyanar, M. Sankarasivaraman, K. Ethnobotanical study of medicinal plants used by Paliyartribals in Theni district of Tamil Nadu, India. *Fitoterapia*; 2008; **79**: 562–568.
7. Jain, DL. Baheti, AM. Jain, SR. Khandelwal, KR. Use of medicinal plants among tribes in Satpuda region of Dhule and Jalgaon districts of Maharashtra-an ethnobotanical survey. *Indian J TradKnowled*.; 2010; **9**:152–157.
8. Jeyaprakash, K. Ayyanar, M. Geetha, KN. Sekar, T. Traditional uses of medicinal plants among the tribal people in Theni districts (Western Ghats), Southern India. *Asian Pac J Trop Biomed.,* 2011; Vol-1(Suppl 1):S20–S25.
9. Jain, SK. Glimpses of the Indian ethnobotany. New Delhi: Oxford and IBH Publishing Co. 1981
10. Jagtap, SD. Deokule, SS. Bhosle, SV. Some unique ethnomedicinal uses of plants used by the Korku tribe of Amravati district of Maharashtra, India. *J Ethnopharmacol.,* 2006; **107**: 463–469.
11. Kala, CP. Current status of medicinal plants used by traditional vaidyas in Uttaranchal State of India. *Ethnobot Res Appl.* 2005; **3**: 267–278.
12. Mahishi, P. Srinivasa, BH. Shivanna, MB. Medicinal plant wealth of local communities in some villages in Shimoga District of Karnataka, India. *J Ethnopharmacol.* 2005; 98: 307–312.
13. Prain, D. Bengal plants, Vol. I-II. Kolkata: Botanical Survey of India 1963.
14. Rajendran, SM. Chandrasekar, K. Sundaresan, V. Ethno medicinal lore of Valayatribals in Seithur hills of Virudhunagar district, Tamil Nadu, India. *Indian J TraditKnowl.* 2002; **1**: 59–71.
15. Sardar, R. Chakraborty, D. Sardar, M. Disharmony between Man-Environment Relationship:A Serious Threa to The Sundarbans Wild Nature, *IJERR,* 2016; **8**: 46-58.
16. Singh, U. Lahiri, N. Ancient India: new research. New Delhi: Oxford University Press 2010;
17. Pei, SJ. Ethnobotanical approaches of Traditional medicine srudies: Some experiences from Asia. *Pharmaceutical Biology,* 2001; **39**: 74-79.
18. World Health Organization (WHO) Geneva: World Health Organization; WHO traditional medicine strategy 2002-2005. Available from [Accessed on 27 October, 2013]
19. Vivekananda Institution of Biotechnology, Nimpith, South 24 Parganas, West Bengal, India.
20. Department of Microbiology, Acharya Prafulla Chandra College, New Barrackpore, Kolkata-700131, West Bengal, India.
21. National committee for Clinical Standards, Reference method for both dilution anti bacterial susceptibility testing of yeast Approved Standard M27-APA: National Committee for Clinical Laboratory Standard Wayne; 2000.